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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : A61L 9/03

A1

(11) International Publication Number: WO 91/07996

(43) International Publication Date: 13 June 1991 (13.06.91)

(21) International Application Number: PCT/US90/07010

(22) International Filing Date: 30 November 1990 (30.11.90)

(30) Priority data:
445,237 4 December 1989 (04.12.89) US

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(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), LU (European patent), NL (European patent), SE (European patent).

Published
With international search report.

(54) Title: FRAGRANCE DEVICE AND METHOD, CHEMICALLY OR MECHANICALLY ACTIVATED

(57) Abstract

A self contained fragrance delivery package having a volatilizable fluent fragrance and a chemical heat source.

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FRAGRANCE DEVICE AND METHOD,CHEMICALLY OR MECHANICALLY ACTIVATED

This invention relates to a fragrance releasing device. More particularly, the invention relates to a self contained package having a fluent, volatilizable fragrance and an exothermic heat source for volatilizing the fragrance.

There are many types of fragrance dispensing systems on the market, which are used in the different places, for example the inner spaces of appliances for the purpose of covering over the odors, in kitchens, bathrooms, and the like. Most of these systems are protected during transport or storage in an aroma-tight packaging, for example, in a bag, in boxes, cans bottles and the like, before their application to avoid unnecessary or undesired aromatic substance emission. The outer packaging is removed only immediately before use of the aroma dispenser. One example of this is the well known sachet. These are passive devices.

Fragrances are dispensed from aerosol cans as a spray. Liquids are used to form a fragrance by evaporation from a wick. In other instances, solid volatilizable cake materials are permitted to evaporate thus dispensing a fragrance. Fragrance candles or burning incense have also been used. Most of these systems produce a short lived or low level of fragrance.

Recently, home air freshening with potpourri has been used. A potpourri is a mixture of leaves, flower petals or buds, stems, seeds and the like. This has been used in a passiv manner where the aroma is simply allowed to emanate into the air. This produces

a very low level of fragrance. An effort to improve on this is the "simmering potpourri". In this system, the potpourri of leaves, flower, stems, seeds etc. are boiled like a tea in a ceramic urn heated by a candle. This system has the following advantages: User is involved and natural scents, cinnamon, apple, bayberry, etc. may be used. It is used once and discarded. It sets a mood in kitchen, fireplace, bedroom or the like.

Simmering potpourri also has other disadvantages: There is the smell of candle burning. The appliance requires washing. Molten candle must be scrapped off of a dish, or holder. It must be carefully watched to prevent possible fires, and spillage also for this reason is not safe with small children and pets.

The present invention provides a simple to operate, disposable, clean potpourri fragrancing device. The device is safe and does not need to be attended, unlike other potpourri devices that need to simmer using an external heat source such as a stove, candle or electrical device. The product and by-products of the chemical reaction are safe unlike the burning of candles, gas stoves or burning of incense. The spent device may be kept, if desired, as a sachet for passive fragrancing of drawers, closets, etc.

The device of the invention may be used in small enclosed spaces such as campers, trailers, or cabins. It can also be used to deliver a secondary benefit such as disinfectant or insect killer/repellant, in combination with the fragrance or by itself.

It is therefore an object of this invention to provide a potpourri that does not require an external heat source while actively releasing fragrance and is disposable and safe and which maybe kept as a sachet if desired; and which is self heating by means of a safe chemical reaction.

A further object of the invention is to provide a fragrance dispensing device equivalent to a simmering potpourri in a self contained package.

These and other objects of the invention will become apparent as the description thereof proceeds.

Briefly, the invention consists of a self heating room fragrancing delivery system having a pouch containing an inner porous pouch of a chemical mixture which reacts with oxygen when exposed to air, generating heat. The heat generated, once the devise is opened, is used to evaporate a fragrance composition adsorbed in a pad placed attached to the walls of the inner pouch.

An insulating pad is provided inside the inner pouch, to direct the heat in one direction and provide a rest for the device.

The novel features of the invention are as follows. A portable self-contained heat generating source used to evaporate a fragrance at the user's will; in a clean disposable manner. A chemical reaction is used to generate the heat. The physical components of the packette and their function, are:

-A peel-off label to operate

-A fragrance pad which is separate or integral with the inner envelope.

-The reactant is contained in an envelope engineered to control the reaction.

-Optionally inclusion of a heat reflector/insulator.

The device of the invention uses heat to evaporate a fragrance or fragrance composition and is simple, portable and disposable. The device is a packette or similar article having a separate compartment to hold the heat-storing/generating chemical composition and an outer envelope or closure to maintain the device serviceable until the time it is used.

The invention can be better understood by reference to the drawings in which:

Figure 1 is a cross sectional view of one embodiment of the fragrance device of the present invention.

Figure 2 is a plan view of the lower side of the inner bag shown in Figure 1;

Figure 3 and 4 are partial views, showing details of the device in Figure 1;

Figure 5 is a cross-sectional view of an alternative embodiment of the invention;

Figure 6 and 7 are respectively, partial top and bottom plan views with parts broken away to show details of the device of Figure 5;

Figure 8 is a graph showing control of heat release over a period of time; and

Figure 9 is a graph showing amount of fragrance release versus temperature and time.

One embodiment of this invention is best understood by reference to Figure 1.

Figure 1 shows a cross section of the device, taken along the lines 2-2 of Figure 1. Envelope 1 has an inner envelope 2 inside. These envelopes are made of heat sealable material or materials sealable by other common method such as high frequency or ultrasonic welding. These may or may not be attached to each other in a single weld at 3 as shown, although it is preferable for economy of manufacture.

Outer envelope 1 is provided with one or more pre-perforated windows 4, Figure 3 and 4 on either one or both sides of envelope 1. The pre-perforated windows 4 are sealed with a label 5 suitable to obstruct the perforations 6 such that the air impermeability of film of envelope 2 is not impaired. The purpose of label 5 is to seal perforation 4 and serve as the activating mechanism for the device. When label 5 is removed, th pr -scored r per-perf rated window 4

is ripped open at perforations 6 and removed since it stays adhered to the label 5 via the sealing adhesive. Although only one window 5 is required to admit air into the device by normal, diffusion; a second window 4A on the bottom of envelope 1 accelerates the process by introducing a draft generated by convection due to the heat generated. The number of windows 4 and their sizes may be chosen as required to control the product's performances and/or for manufacturing reasons.

The inner envelope 2 is used to contain the reactants 7 and to provide a means to throttle the kinetics of the reaction. The reaction is controlled by the rate of flow of air (oxygen) into the chemical mixture by judicious selection of the degree of porosity of the material forming the envelope. Figure 2 depicts one case where the material of envelope 2 is actually non-porous but a plurality of air ducts 8 have been provided to about one third of the total surface area 9. The total number of air ducts can be varied at will as is the surface area covered by them. At one extreme, a single orifice may be provided; at the other, a woven or non-woven membrane may be used having various pore size densities. It is also contemplated for the purpose of controlling the air flow, that the materials composing the upper and lower surfaces 10 and 11 of envelope 2 may be of two dissimilar materials. For example, one surface may be made of porous material while the other may be non-porous or have a discrete number of vent orifices, as mentioned above.

The thickness of the materials chosen for envelope 2 can also be a reaction controlling parameter and may be chosen from a few thousands of an inch thick to several tenths of an inch. This is important, for example, for one embodiment of the invention. Figure 1 shows an example where both sides of the envelope 2 are identical. It also shows that between the lower side 11 of envelope 2 and the outer envelope 1, there is a

pad of material 12 substantially thicker than either of the materials for either envelopes 1 or 2. This is an insulator. The function of pad 12 is described below. In this arrangement, the lower side 11 of the inner envelope 2 and the insulator pad 12 may be collapsed into one single material layer. In this case the air flow is directed preferentially from above. This arrangement, aside from providing a different reaction environment, presents an economic advantage in manufacturing and material usage.

The device 4 may be provided with a heat insulator 12 on one of its sides as previously described. Although the device will work without the insulator; some advantages are derived from its inclusion in the package. There is a thermodynamic advantage in that heat flow from exothermic heat mixture reactants 7 is restricted in the direction of the insulator, therefore there is enhancement in the efficient use of the heat energy released heat pad 13 carrying the fragrance composition to evaporate and propel the fragrance molecules into the atmosphere, i.e. the higher the energy input, the higher the average kinetic energy of the fragrance molecules - or the partial pressure of the system - thus the greater fragrance output obtained with the device.

The secondary advantage derived from insulator 12 is the deflection of heat away from the surface on which the fragrance device rests. Some surfaces where the fragrance device may be laid could be heat sensitive and could be damaged. Again, this prevents, also, the resting surface from becoming a thermodynamically preferred heat sink, thus making the direction of heat flow less than optimal.

Figure 5, 6 and 7 show a second embodiment of the invention having an outer air impermeable envelope 20 with upper and lower layers 21 and 22 respectively, sealed at seam 23. Envelope 20 contains an inner

envelope 24 having a lower surface 25, an upper surface 26 and a heat insulating layer 27 in contact with the inner side of lower surface 25. The upper surface 26 has a porous layer 28 which may be woven or felt like which carries the fragrance and is also air permeable. Inner envelope 24 contains the heat producing chemical mixture 29.

Additional air openings 30 may be provided in lower surface 25 which are used in combination with an air permeable insulation layer 27 to admit air to the reaction mixture 29. To activate this embodiment, one simply removes the inner envelope 24 from outer envelope 20, which then allows air to enter openings 30 and activate the heating mixture 29. The heat from exothermic mixture 29 evaporates the fragrance from layer 28 to provide a fragrance in the immediate atmosphere, i.e. in room, closet or the like. As indicated, the inner layer 25, has openings 30 closed with a porous membrane or pad 27 used to regulate the inflow of air into the package and also pad 28 to carry the fragrance. If the same pad or membrane is used for both purposes e.g. pad 28, the amount of fragrance on the pad should be limited to an amount which will not seal the pores which would starve the reaction from the inflow of oxygen. Otherwise, the area of the pad carrying the fragrance may be isolated by any suitable means.

EXAMPLE I

Self-heating fragrance generating pouches were prepared with two polyethylene coated aluminum film sections 3 x 3" in size. For the bottom layer, the film was perforated with eight orifices 13/32" in diameter having a total area of 1.03 in. then the film was laminated with a textured non-woven membrane 80gms/sq. yd. in weight made of rayon/polypropylene, thus closing the orifice. For the top layer, the film was perf rated with a singl opening 1 7/8 x 1 7/8".

The opening was closed with a pad made of polyester felt, 2 x 2" and .08" thick.

The pouch thus formed was filled with 25gms. of the composition shown in Table I below. The pad was saturated with 2.5gms of a fragrance composition shown in Table II below. The completed pouches were individually packed in air tight envelopes. After several days (4) representative samples were tested for heat generation & fragrance delivery. [Figure 8 is a typical curve of the exotherm generated by the devise. The measurement was carried out with a copper thermocouple using a Linseis chart recorder model type 2045.

To evaluate the fragrancing ability of the device twelve individual judges were given samples to test in their home environments, for fragrance generation. All concurred in the ability of the devises to fragrance the environment for from 1 to 3 hrs.]

EXOTHERMIC COMPOSITION TABLE I

Ingredient Name	Amount
Cab-o-sil	4.000000
Sodium Chloride	4.800000
Water	19.200000
Activated Carbon Powders	7.200000
Iron (325 Mesh)	64.800000

TABLE II

Fragrance Composition	
Lemon Fragrance	5.0
Volatile Silicone	10.0
Cetyl Dodecanol	1.0
Ethyl Alcohol 95%	5.0
Span 85	0.5

Example II

Air (oxygen) diffusivity into the package is key to the control of reaction rate. To determine the optimal area for air (oxygen) intake, flow experiments

were carried out. While holding the following parameters constant; chemical composition, particle size of reactants, total amount of reactants, packing density, package surface area and membrane porosity, the percent surface area of the total package allowed for the air inlet membrane was varied from 0.25% to 100% in eight steps. Eight packages were prepared and their temperature profiles recorded. Each generated a distinct heat profile; the packages with the larger membrane surface area gave the greatest initial exotherm but the shortest time at high temperature (above 40°C, 104°F). The package with smaller membrane surfaces showed lower initial exotherms but progressively longer durations up to four hours above 104°F. The heat profiles are shown in Figure 9.

One of the objectives in controlling the heat generation profile is the potential ability to deliver a fragrance in a way that is most preferred by the consumer. A floral fragrance (high volatility) for example, may require delivery at low temperature for an extended period of time; while an oriental or a spicy fragrance may require high temperature for a relatively short duration to get the less volatile components airborne.

Studies of fragrance delivery under high temperature conditions (104°F-158°F), show that temperatures as high as 158°F are necessary to volatilize a typical fragrance (Lemon), such that at least 0.5 gm. is delivered within one hour. This result was obtained by placing 2 gms. of fragrance on an aluminum dish on a hot plate having a surface temperature of 158°F. According to IFF 0.125-0.155 grams delivered in a 9' x 12' room are the threshold level required for fragrance perception. The fragrance delivery method of the present invention is capable of sustaining 158°F for about 40 minutes with a peak temperature of 176°F.

This is sufficient to meet the above requirements to volatilize a typical fragrance.

I Claim:

1. A self contained fragrance release package comprising a fluent, volatizable fragrance material and an air activatable chemical heat source.

2. A self contained fragrance release device as in claim 1, wherein said fragrance material is contained in or on a porous substrate, and said chemical heat source is in heat contact with said porous substrate.

3. A fragrance release device as in claim 1 wherein said fragrance and chemical heat source are sealed in an airtight container.

4. A fragrance release device as in claim 1 wherein said chemical heat source comprises a mixture of finely divided iron, carbon, sodium chloride and water.

5. A method for releasing a fragrance in an area, which comprises heating a fluent, volatizable fragrance with a chemical heat source.

6. A method for obtaining a controlled heat release over an extended period of time in a fragrance delivery package having a volatizable, fluent fragrance heated by an air activatable chemical heat source, which comprises regulating the air supply to the chemical heat source.

7. The method of claim 6 wherein said chemical heat source is a mixture of finely divided iron, carbon, sodium chloride and water.

8. The method of claim 7 wherein said mixture of contained in an airtight package to which air may be admitted to a desired rate to obtain a predesired level of heat over a predesired time, thereby providing a predesired fragrance level over a predesired period of time.

9. A method for obtaining optimum fragrance release in a self contained fragrance package comprising a v litilizable fluent fragrance and an air

activatable heat source, which comprises controlling the rate of heat release from the heat source in accordance with the volatility of the fragrance composition.

10. The method of claim 9 wherein said heat release is inversely proportional to the volatility of the fragrance material.

11. The method of claim 10 wherein the amount of heat release is controlled to provide a high rate of heat release for a low volatility fragrance material.

12. The method of claim 11 wherein the amount of heat release is controlled to provide a low rate of heat release for a high volatility fragrance material.

1/5

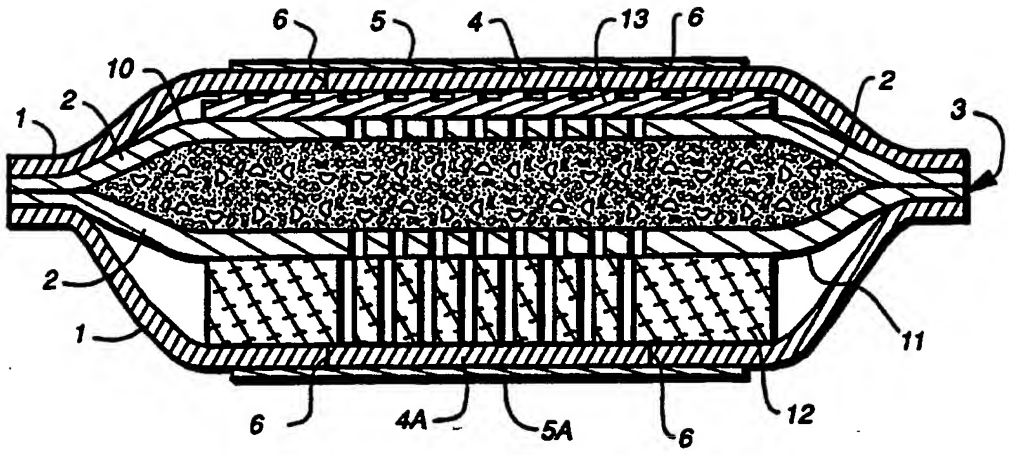


FIG._1

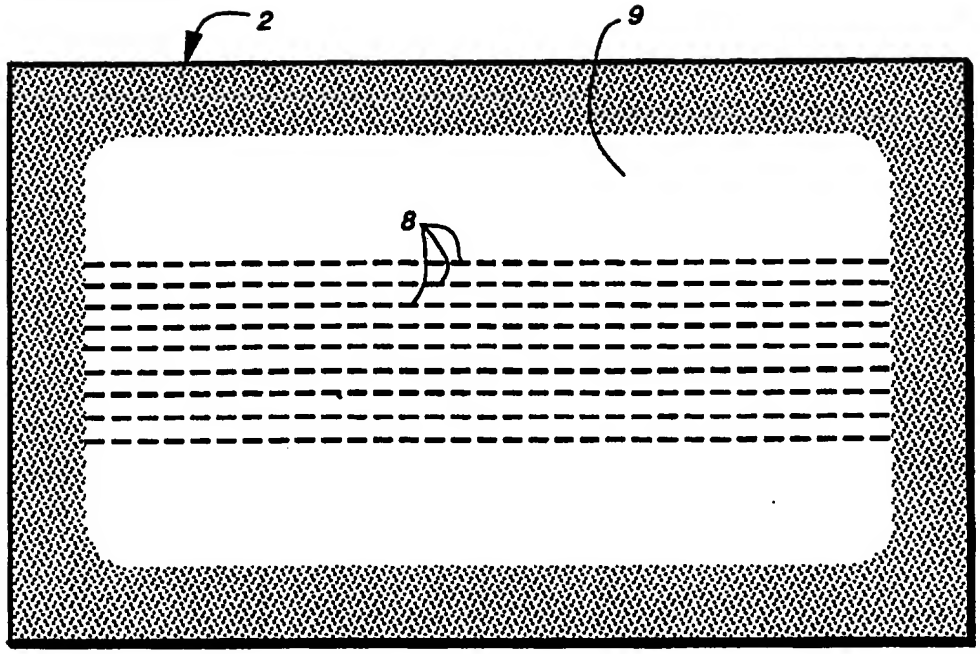


FIG._2

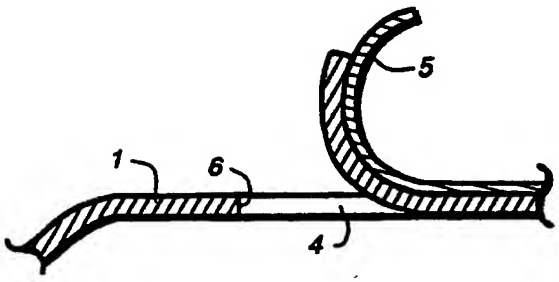


FIG._3

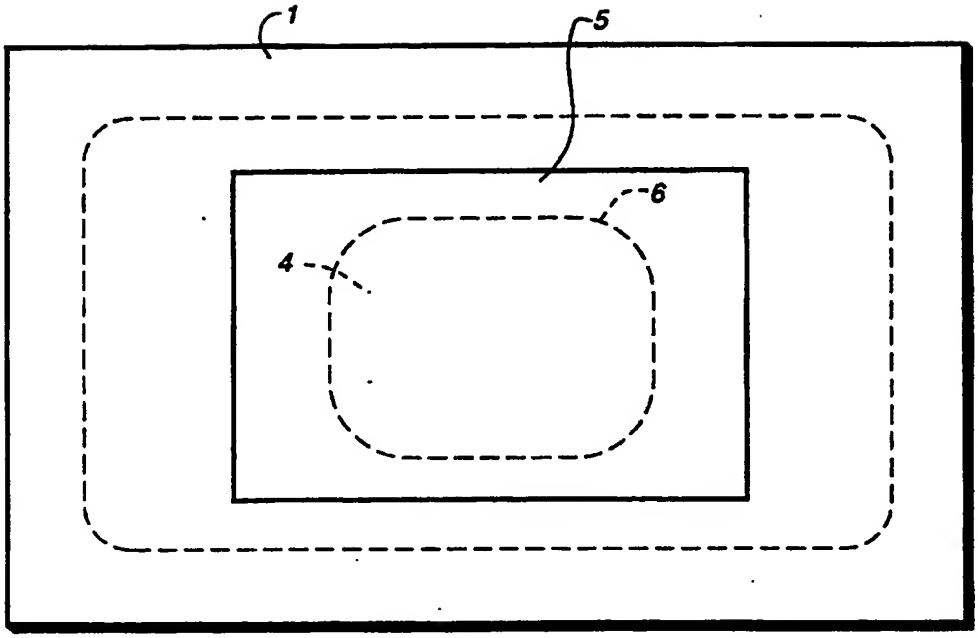


FIG._4

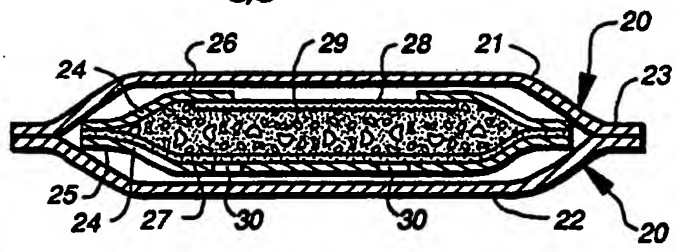


FIG._5

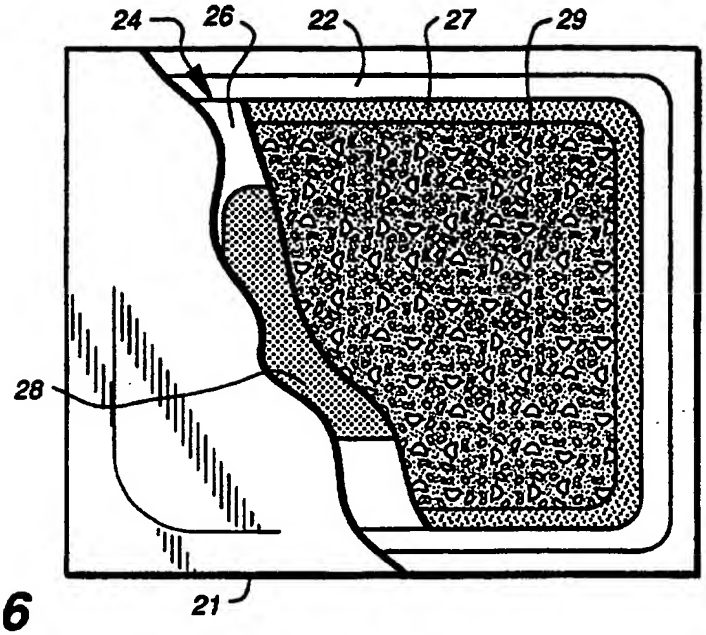


FIG._6

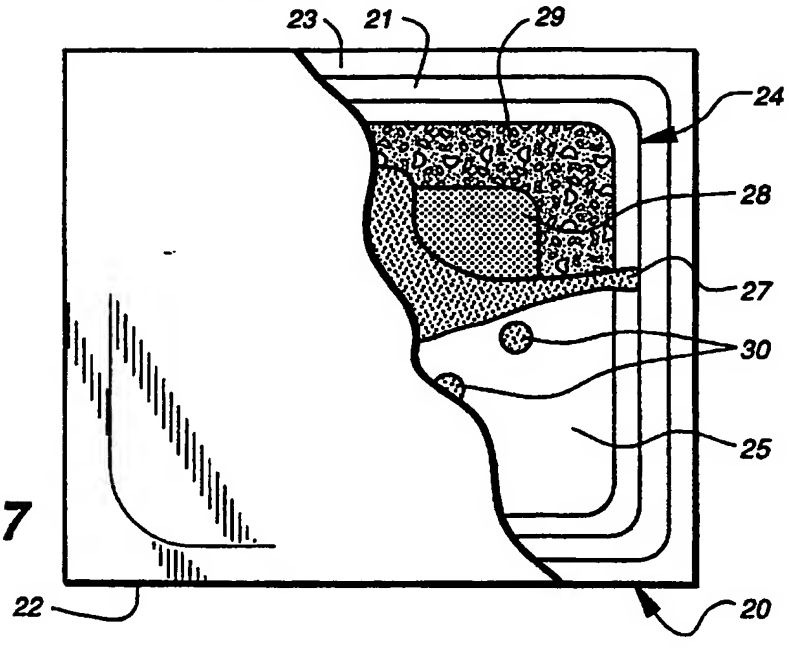


FIG._7

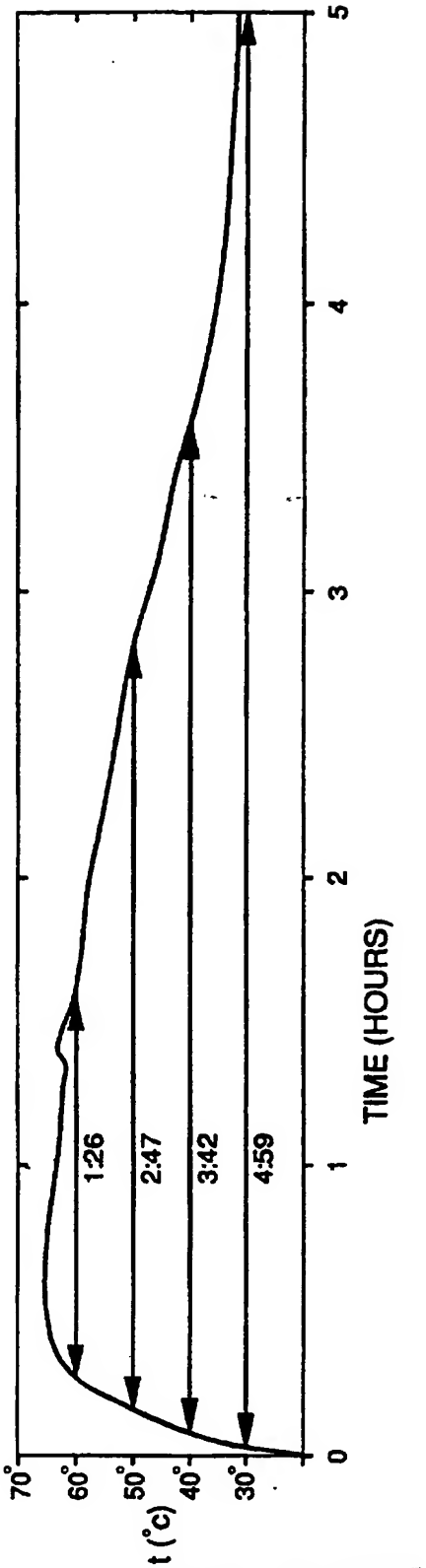
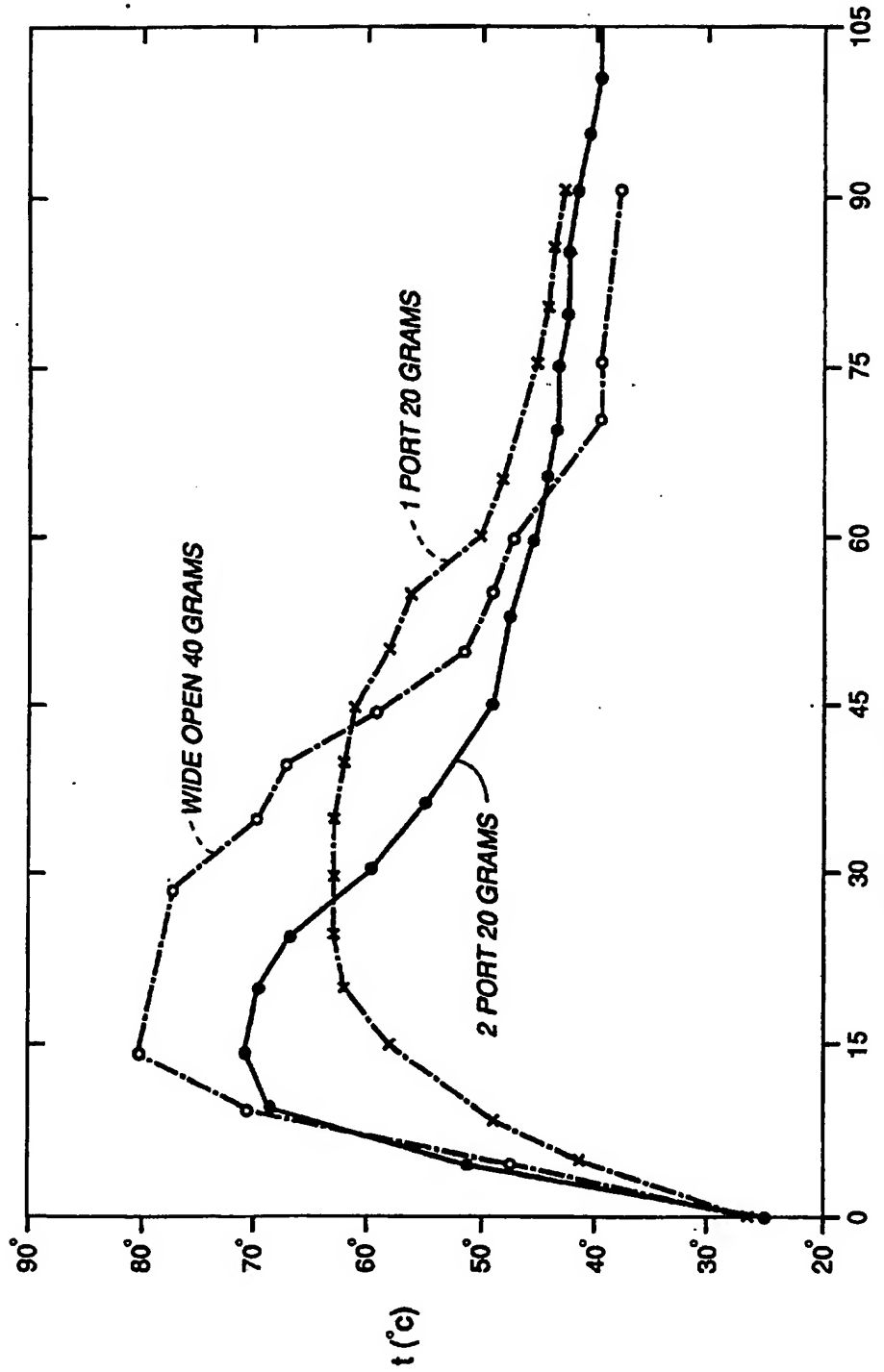


FIG._8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90°
80°
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105
TIME (MINUTES)

FIG._9

INTERNATIONAL SEARCH REPORT

International Application No[9] PCT/US 90/07010

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 A61L9/03

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	A61L

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
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A	GB,A,823377 (WAECO LTD) 11 November 1959	
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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
28 FEBRUARY 1991	26. 03. 91
International Searching Authority	**Signature of Authorized Officer**
EUR PEAN PATENT FFICE	4153 D.S. KOWALCZYK

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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

PCT/US 90/07010
SA 43053

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
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